

CLAIMS

1. A semiconductor substrate processing chamber and substrate transfer chamber interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and a substrate transfer chamber;

the body comprising a substrate passageway extending therethrough, the passageway comprising walls at least a portion of which are substantially metallic; and

the body comprising material peripheral of the walls which is substantially non-metallic and thermally insulative, the substantially non-metallic material comprising mounting openings extending at least partially therein.

2. The interfacial structure of claim 1 wherein all of the passageway walls are substantially metallic.

3. The interfacial structure of claim 1 wherein the body has a greater volume of substantially non-metallic and thermally insulative material than of substantially metallic material.

4. The interfacial structure of claim 1 wherein the substantially non-metallic and thermally insulative material is polymeric.

5. The interfacial structure of claim 1 wherein the substantially non-metallic and thermally insulative material is a gel.

6. The interfacial structure of claim 1 wherein the substantially non-metallic and thermally insulative material is ceramic.

7. The interfacial structure of claim 1 wherein the substantially non-metallic and thermally insulative material is a porous.

8. The interfacial structure of claim 1 wherein the substantially non-metallic and thermally insulative material is a glass.

9. The interfacial structure of claim 1 wherein the substantially non-metallic and thermally insulative material is a combination of at least two of solid, liquid and gas.

10. The interfacial structure of claim 1 wherein the passageway walls comprises at least two wall openings positioned to establish a gas curtain across the passageway upon effective emission of gas from said wall openings, and further comprising at least one gas feed conduit in fluid communication with the wall openings.

11. A semiconductor substrate processing chamber and substrate transfer chamber interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and a substrate transfer chamber, the body comprising a total volume, at least a majority of the total volume being a mass of material which is substantially non-metallic and thermally insulative;

the body comprising a substrate passageway extending therethrough; and a sealant channel received on the body peripheral of the passageway.

12. The interfacial structure of claim 11 wherein the sealant channel surrounds the passageway.

13. The interfacial structure of claim 11 wherein the sealant channel comprises an o-ring groove peripherally surrounding the passageway.

14. The interfacial structure of claim 11 wherein the body comprises a substantially metallic insert received within the passageway, the insert defining an insert substrate passageway therethrough, the sealant channel being received on the substantially metallic insert.

15. The interfacial structure of claim 11 wherein the substantially non-metallic and thermally insulative material is polymeric.

16. The interfacial structure of claim 11 wherein the body is substantially rectangular.

17. The interfacial structure of claim 11 wherein the body comprises at least one face having a majority area which is substantially metallic.

18. The interfacial structure of claim 11 wherein the body comprises at least one face having a majority area which is substantially non-metallic.

19. The interfacial structure of claim 11 wherein the body comprises at least one face configured for contacting a semiconductor substrate processing chamber, and another face configured for contacting a substrate transfer chamber.

20. The interfacial structure of claim 19 wherein the one and another faces are generally planar.

21. The interfacial structure of claim 19 wherein the sealant channel is formed on the one face.

22. The interfacial structure of claim 19 wherein the another face has a majority area which is substantially metallic.

23. A semiconductor substrate processing chamber and substrate transfer chamber-interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and a substrate transfer chamber, the body having first and second faces;

the body comprising a substrate passageway extending therethrough from the first face to the second face;

the body comprising an external perimeter extending between the first and second faces; and

the body comprising a volume in at least one cross sectional region transverse the passageway which extends to diametrically opposing portions of the perimeter, at least a majority of said cross sectional region constituting a substantially non-metallic and thermally insulative material.

24. The interfacial structure of claim 23 wherein the passageway comprises walls, at least a portion of the walls being substantially metallic.

25. The interfacial structure of claim 23 wherein the cross sectional region is at least one inch deep.

26. The interfacial structure of claim 23 wherein the cross sectional region is from one inch to two inches deep.

27. The interfacial structure of claim 23 wherein the body comprises substantially metallic material, the body having a greater volume of substantially non-metallic and thermally insulative material than of substantially metallic material.

28. The interfacial structure of claim 23 wherein the body comprises at least one face configured for contacting a semiconductor substrate processing chamber, and another face configured for contacting a substrate transfer chamber.

29. A semiconductor substrate processing chamber and substrate transfer chamber interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and a substrate transfer chamber; the body comprising a mass of substantially non-metallic and thermally insulative material;

the mass comprising a substrate passageway extending through the thermally insulative material; and

the body comprising a substantially metallic insert received within the thermally insulative material substrate passageway, the insert defining an insert substrate passageway therethrough.

30. The interfacial structure of claim 29 wherein the body has a greater volume of substantially non-metallic and thermally insulative material than of substantially metallic material.

31. The interfacial structure of claim 29 wherein the substantially non-metallic and thermally insulative material is polymeric.

32. The interfacial structure of claim 29 comprising bolt holes extending through the mass and spaced from the passageway.

33. The interfacial structure of claim 29 wherein the body comprises a plurality of openings spaced from the passageway and which extend through the insulative material; and further comprising load bearing plugs received within at least some of the openings in the thermally insulative material, the load bearing plugs having greater compression strength than the thermally insulative material.

34. A semiconductor substrate processing chamber and substrate transfer chamber interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and a substrate transfer chamber, the body comprising a mass of substantially non-metallic and thermally insulative material;

the body comprising a substrate passageway extending through the thermally insulative material;

the body comprising a plurality of openings spaced from the passageway and which extend through the thermally insulative material; and

the body comprising load bearing plugs received within at least some of the openings in the thermally insulative material, the load bearing plugs having greater compression strength than the thermally insulative material.

35. The interfacial structure of claim 34 wherein at least some of the load bearing plugs are entirely solid.

36. The interfacial structure of claim 34 wherein at least some of the load bearing plugs include a hollow portion.

37. The interfacial structure of claim 34 wherein at least some of the load bearing plugs are entirely solid and at least some include a hollow portion.

38. The interfacial structure of claim 34 wherein the body is substantially rectangular having outermost corners, at least four of said openings and load bearing plugs being respectively received proximate the outermost corners.

39. The interfacial structure of claim 38 wherein said four load bearing plugs are entirely solid.

40. The interfacial structure of claim 34 wherein the body comprises a substantially metallic insert received within the passageway, the insert defining an insert substrate passageway therethrough.

41. A semiconductor substrate processing chamber and substrate transfer chamber interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and a substrate transfer chamber; the body comprising both substantially non-metallic, thermally insulative material and substantially metallic material; the body having a greater volume of substantially non-metallic and thermally insulative material than of substantially metallic material;

the body comprising a substrate passageway extending therethrough, the passageway comprising walls which define a passageway circumference;

at least two wall openings within the walls positioned to establish a gas curtain across the passageway upon effective emission of gas from said wall openings; and

at least one gas feed conduit in fluid communication with the wall openings.

42. The interfacial structure of claim 41 comprising at least two gas feed conduits in fluid communication with the wall openings.

43. The interfacial structure of claim 41 comprising only two gas feed conduits in fluid communication with the wall openings.

44. The interfacial structure of claim 41 comprising at least 4 wall openings within the walls positioned to establish a gas curtain across the passageway upon effective emission of gas from said wall openings.

45. The interfacial structure of claim 41 comprising at least 10 wall openings within the walls positioned to establish a gas curtain across the passageway upon effective emission of gas from said wall openings.

46. The interfacial structure of claim 41 comprising multiple pairs of directly opposing wall openings within the walls positioned to establish a gas curtain across the passageway upon effective emission of gas from said wall openings.

47. A semiconductor substrate processing chamber and substrate transfer chamber interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and a substrate transfer chamber, the body comprising a mass of substantially non-metallic and thermally insulative material, the mass having first and second faces, the body having a greater volume of substantially non-metallic and thermally insulative material than of substantially metallic material;

the body comprising a substrate passageway extending through the thermally insulative material from the first face to the second face;

the body comprising a substantially metallic insert received within the thermally insulative material substrate passageway, the insert having internal walls defining an insert substrate passageway through the insert, the walls defining an insert substrate passageway circumference, at least two wall openings received within the walls positioned to establish a gas curtain across the insert passageway upon effective emission of gas from said wall openings; and

at least one gas feed conduit in fluid communication with the wall openings.

48. The interfacial structure of claim 47 wherein the substantially non-metallic and thermally insulative material is polymeric.

49. The interfacial structure of claim 47 further comprising a sealant channel received on the body.

50. The interfacial structure of claim 49 further comprising a sealant channel received on the substantially metallic insert.

51. The interfacial structure of claim 47 wherein the body comprises a plurality of openings spaced from the passageway and which extend through the insulative material, and further comprising load bearing plugs received within at least some of the openings in the thermally insulative material, the load bearing plugs having greater compression strength than the thermally insulative material.

52. A semiconductor substrate processing chamber and substrate transfer chamber interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and a substrate transfer chamber, the body comprising a mass of substantially non-metallic and thermally insulative material, the mass having first and second opposing and generally planar faces, one of the faces having a recess formed therein;

the body comprising a substrate passageway extending through the thermally insulative material from the first face to the second face;

the body comprising a plurality of openings spaced from the passageway and which extend through the thermally insulative material;

the body comprising a substantially metallic insert received within the thermally insulative material substrate passageway, the insert having internal walls defining an insert substrate passageway through the insert, the walls defining an insert substrate passageway circumference, at least two wall openings received within the walls positioned to establish a gas curtain across the insert passageway upon effective emission of gas from said wall openings;

at least one gas feed conduit in fluid communication with the wall openings;

the body comprising load bearing plugs received within at least some of the openings in the thermally insulative material, the load bearing plugs having greater compression strength than the thermally insulative material; and

the body comprising a metal plate in physical connection with the substantially metallic insert, the metal plate being received with the face recess of the mass of substantially non-metallic and thermally insulative material.

53. The interfacial structure of claim 52 wherein the body has a greater volume of substantially non-metallic and thermally insulative material than of substantially metallic material.

54. The interfacial structure of claim 52 further comprising a sealant channel received on the body.

55. The interfacial structure of claim 54 further comprising a sealant channel received on the substantially metallic insert.

56. The interfacial structure of claim 52 wherein the body is substantially rectangular.

57. The interfacial structure of claim 52 wherein at least some of the load bearing plugs are entirely solid.

58. The interfacial structure of claim 52 wherein at least some of the load bearing plugs include a hollow portion.

59. The interfacial structure of claim 52 wherein at least some of the load bearing plugs are entirely solid and at least some include a hollow portion.

60. The interfacial structure of claim 52 wherein the body is substantially rectangular having outermost corners, at least four of the openings within the insulative material and load bearing plugs being respectively received proximate the outermost corners.

61. The interfacial structure of claim 60 wherein said four load bearing plugs are entirely solid.

62. The interfacial structure of claim 60 comprising at least two gas feed conduits in fluid communication with the wall openings.

63. The interfacial structure of claim 60 comprising only two gas feed conduits in fluid communication with the wall openings.

64. The interfacial structure of claim 60 comprising at least 4 wall openings within the walls positioned to establish a gas curtain across the passageway upon effective emission of gas from said wall openings.

65. The interfacial structure of claim 60 comprising at least 10 wall openings within the walls positioned to establish a gas curtain across the passageway upon effective emission of gas from said wall openings.

66. The interfacial structure of claim 60 comprising multiple pairs of directly opposing wall openings within the walls positioned to establish a gas curtain across the passageway upon effective emission of gas from said wall openings.

67. A semiconductor substrate processor comprising:  
a semiconductor substrate transfer chamber and a plurality of semiconductor substrate processing chambers connected therewith; and  
an interfacial structure received between at least one of the semiconductor substrate processing chambers and the transfer chamber, the interfacial structure comprising a substantially non-metallic, thermally insulative mass of material interposed between the one processing chamber and the transfer chamber, the mass being of sufficient volume to effectively reduce heat transfer from the semiconductor substrate processing chamber to the semiconductor substrate transfer chamber than would otherwise occur in the absence of said mass of material.

68. The processor of claim 67 wherein the interfacial structure comprises a body comprising a substrate passageway extending therethrough, the passageway comprising walls at least a portion of which are substantially metallic; and the body comprising material peripheral of the walls which is substantially non-metallic and thermally insulative.

69. The processor of claim 67 wherein the interfacial structure comprises a body comprising a total volume, at least a majority of the total volume being of material which is substantially non-metallic and thermally insulative; the body comprising a substrate passageway extending therethrough; and a sealant channel received on the body peripheral of the passageway.

70. The processor of claim 67 wherein the interfacial structure comprises a body having first and second faces;

the body comprising a substrate passageway extending therethrough from the first face to the second face;

the body comprising an external perimeter extending between the first and second faces; and

the body comprising a volume in at least one cross sectional region transverse the passageway which extends to diametrically opposing portions of the perimeter, at least a majority of said cross sectional region constituting a substantially non-metallic and thermally insulative material.

71. The processor of claim 67 wherein the interfacial structure comprises a body comprising a mass of substantially non-metallic and thermally insulative material;

the mass comprising a substrate passageway extending through the thermally insulative material; and

the body comprising a substantially metallic insert received within the thermally insulative material substrate passageway, the insert defining an insert substrate passageway therethrough.

72. The processor of claim 67 wherein the interfacial structure comprises a body comprising a mass of substantially non-metallic and thermally insulative material;

the body comprising a substrate passageway extending through the thermally insulative material;

the body comprising a plurality of openings spaced from the passageway and which extend through the thermally insulative material; and

the body comprising load bearing plugs received within at least some of the openings in the thermally insulative material, the load bearing plugs having greater compression strength than the thermally insulative material.

73. The processor of claim 67 wherein the interfacial structure comprises a body comprising both substantially non-metallic, thermally insulative material and substantially metallic material; the body having a greater volume of substantially non-metallic and thermally insulative material than of substantially metallic material;

the body comprising a substrate passageway extending therethrough, the passageway comprising walls which define a passageway circumference;

at least two wall openings within the walls positioned to establish a gas curtain across the passageway upon effective emission of gas from said wall openings; and

at least one gas feed conduit in fluid communication with the wall openings.

74. The processor of claim 67 wherein the interfacial structure comprises a body comprising a mass of substantially non-metallic and thermally insulative material, the mass having first and second faces, the body having a greater volume of substantially non-metallic and thermally insulative material than of substantially metallic material;

the body comprising a substrate passageway extending through the thermally insulative material from the first face to the second face;

the body comprising a substantially metallic insert received within the thermally insulative material substrate passageway, the insert having internal walls defining an insert substrate passageway through the insert, the walls defining an insert substrate passageway circumference, at least two wall openings received within the walls positioned to establish a gas curtain across the insert passageway upon effective emission of gas from said wall openings; and

at least one gas feed conduit in fluid communication with the wall openings.

75. The processor of claim 67 wherein the interfacial structure comprises a body comprising a mass of substantially non-metallic and thermally insulative material, the mass having first and second opposing and generally planar faces, one of the faces having a recess formed therein;

the body comprising a substrate passageway extending through the thermally insulative material from the first face to the second face;

the body comprising a plurality of openings spaced from the passageway and which extend through the thermally insulative material;

the body comprising a substantially metallic insert received within the thermally insulative material substrate passageway, the insert having internal walls defining an insert substrate passageway through the insert, the walls defining an insert substrate passageway circumference, at least two wall openings received within the walls positioned to establish a gas curtain across the insert passageway upon effective emission of gas from said wall openings;

at least one gas feed conduit in fluid communication with the wall openings;

the body comprising load bearing plugs received within at least some of the openings in the thermally insulative material, the load bearing plugs having greater compression strength than the thermally insulative material; and

the body comprising a metal plate in physical connection with the substantially metallic insert, the metal plate being received with the face recess of the mass of substantially non-metallic and thermally insulative material.

76. A semiconductor substrate processing chamber and accessory attachment interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and an accessory attachment which is exposed to the processing chamber, the body having first and second faces;

the body comprising an external perimeter extending between the first and second faces; and

the body comprising a volume in at least one cross sectional region transverse the passageway which extends to diametrically opposing portions of the perimeter, at least a majority of said cross sectional region constituting a mass of substantially non-metallic and thermally insulative material, the mass of material being sufficient to effectively reduce heat transfer between the semiconductor processing chamber and the accessory attachment when so engaged than would otherwise occur in the absence of said mass of material when so engaged.

77. The interfacial structure of claim 76 comprising mounting openings extending through the mass of material.

78. The interfacial structure of claim 76 wherein the substantially non-metallic and thermally insulative material is polymeric.

79. The interfacial structure of claim 76 wherein the substantially non-metallic and thermally insulative material is a gel.

80. The interfacial structure of claim 76 wherein the substantially non-metallic and thermally insulative material is ceramic.

81. The interfacial structure of claim 76 wherein the substantially non-metallic and thermally insulative material is porous.

82. The interfacial structure of claim 76 wherein the substantially non-metallic and thermally insulative material is a glass.

83. The interfacial structure of claim 76 wherein the substantially non-metallic and thermally insulative material is a combination of at least two of solid, liquid and gas.

84. The manifold assembly of claim 76 comprising a sealant channel received on the body.

85. The manifold assembly of claim 84 wherein the sealant channel comprises an o-ring groove.

86. The interfacial structure of claim 76 wherein the cross sectional region is at least one inch deep.

87. The interfacial structure of claim 76 wherein the cross sectional region is from one inch to two inches deep.

88. The interfacial structure of claim 76 wherein the body comprises substantially metallic material, the body having a greater volume of substantially non-metallic and thermally insulative material than of substantially metallic material.

89. The interfacial structure of claim 76 wherein the body comprises a plurality of openings which extend through the insulative material, and further comprising load bearing plugs received within at least some of the openings in the thermally insulative material, the load bearing plugs having greater compression strength than the thermally insulative material.

90. The interfacial structure of claim 89 wherein at least some of the load bearing plugs are entirely solid.

91. The interfacial structure of claim 89 wherein at least some of the load bearing plugs include a hollow portion.

92. The interfacial structure of claim 89 wherein at least some of the load bearing plugs are entirely solid and at least some include a hollow portion.

93. The interfacial structure of claim 89 wherein the body is substantially rectangular having outermost corners, at least four of said openings and load bearing plugs being respectively received proximate the outermost corners.

94. The interfacial structure of claim 93 wherein said four load bearing plugs are entirely solid.

95. A semiconductor substrate processing chamber and accessory attachment interfacial structure, comprising:

a body sized and shaped to engage with and between a semiconductor substrate processing chamber and an accessory attachment which is exposed to the processing chamber, the body comprising a total volume, at least a majority of the total volume being a mass of material which is substantially non-metallic and thermally insulative, the mass of material being sufficient to effectively reduce heat transfer between the semiconductor processing chamber and the accessory attachment when so engaged than would otherwise occur in the absence of said mass of material when so engaged.

96. The interfacial structure of claim 95 comprising mounting openings extending through the mass of material.

97. The interfacial structure of claim 95 wherein the substantially non-metallic and thermally insulative material is polymeric.

98. The interfacial structure of claim 95 wherein the substantially non-metallic and thermally insulative material is a gel.

99. The interfacial structure of claim 95 wherein the substantially non-metallic and thermally insulative material is ceramic.

100. The interfacial structure of claim 95 wherein the substantially non-metallic and thermally insulative material is porous.

101. The interfacial structure of claim 95 wherein the substantially non-metallic and thermally insulative material is a glass.

102. The interfacial structure of claim 95 wherein the substantially non-metallic and thermally insulative material is a combination of at least two of solid, liquid and gas.

103. The manifold assembly of claim 95 comprising a sealant channel received on the body.

104. The interfacial structure of claim 95 wherein the body comprises a plurality of openings which extend through the insulative material, and further comprising load bearing plugs received within at least some of the openings in the thermally insulative material, the load bearing plugs having greater compression strength than the thermally insulative material.

105. The interfacial structure of claim 104 wherein at least some of the load bearing plugs are entirely solid.

106. The interfacial structure of claim 104 wherein at least some of the load bearing plugs include a hollow portion.

107. The interfacial structure of claim 104 wherein at least some of the load bearing plugs are entirely solid and at least some include a hollow portion.

108. The interfacial structure of claim 104 wherein the body is substantially rectangular having outermost corners, at least four of said openings and load bearing plugs being respectively received proximate the outermost corners.

109. The interfacial structure of claim 108 wherein said four load bearing plugs are entirely solid.